

FORM PTO-1390

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371

713-428

U.S. APPLICATION NO. (If known, use 37 CFR 1.5)

09/744692

INTERNATIONAL APPLICATION NO.

PCT/IT99/00248

INTERNATIONAL FILING DATE

28 July 1999 (28.07.99)

PRIORITY DATE CLAIMED

28 July 1998 (28.07.98)

## TITLE OF INVENTION

BOARD-MOUNTED ELECTRONIC DEVICE, IN PARTICULAR AN ELECTRONIC GAS  
LIGHTER, INCLUDING MEANS FOR FAST CONNECTION OF INSULATED ELECTRIC WIRES  
TO AN ELECTRIC CIRCUIT ON THE BOARD

APPLICANT(S) FOR DO/EO/US

Massimo ALEARDI and Raoul BIACHI

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
  - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ has been transmitted by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☐ A English translation of the International Application into English (35 U.S.C. 371(c)(2)).
  - a. ☐ is attached hereto
  - b. ☐ has been previously submitted under 35 U.S.C. 154 371 (c)(2)
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
  - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ have been transmitted by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendment has NOT expired.
  - d. ☐ have not been made and will not be made.
8. ☐ A English translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A English translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

## Items 11. to 20. below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☐ A FIRST preliminary amendment.
14. ☐ A SECOND or SUBSEQUENT preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821-1.825
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4)
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4)
20. ☒ Other items or information.
  - a. PCT/IPEA/416 - International Preliminary Examination Report
  - b. PCT/ISA/220 & 210 - International Search Report

|  |   |                                     |
|--|---|-------------------------------------|
| U.S. APPLIC. NO. (if known, see 37 CFR 1.5)<br><div style="font-size: 1.5em; font-weight: bold;">09/744692</div> | INTERNATIONAL APPLICATION NO.<br>PCT/IT99/00248 | ATTORNEY'S DOCKET NUMBER<br>713-428 |
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|   |                                |
|---|--------------------------------|
| 21. <input checked="" type="checkbox"/> The following fees are submitted:<br><b>Basic National Fee (37 CFR 1.492(a)(1)-(5)):</b><br>Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO ..... \$ <b>1000.00</b><br>International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO and JPO ..... \$ <b>860.00</b><br>International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... \$ <b>710.00</b><br>International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) ..... \$ <b>690.00</b><br>International preliminary examination fee paid to USPTO (37 CFR 1.482) And all claims satisfied provisions of PCT Article 33(2)-(4) ..... \$ <b>100.00</b><br><div style="text-align: right; font-weight: bold;">ENTER APPROPRIATE BASIC FEE AMOUNT = \$ <b>860.00</b></div> | CALCULATIONS      PTO USE ONLY |
|---|--------------------------------|

|  |              |              |           |                        |         |
|--|--------------|--------------|-----------|------------------------|---------|
| Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).          |              |              |           | \$                     | 0.00    |
| CLAIMS   | NUMBER FILED | NUMBER EXTRA | RATE      |                        |         |
| Total Claims   | 5 - 20 =     |              | X \$18.00 | \$                     | 0.00    |
| Independent Claims   | 1 - 3 =      |              | X \$78.00 | \$                     | 0.00    |
| Multiple dependent claim(s) (if applicable)  |              |              |           | + \$260.00             | \$ 0.00 |
| TOTAL OF ABOVE CALCULATIONS =  |              |              |           | \$                     | 860.00  |
| <input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.   |              |              |           | \$                     | 0.00    |
| SUBTOTAL =   |              |              |           | \$                     | 0.00    |
| Processing fee of \$130.00 for furnishing the English translation later than the <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)). |              |              |           | \$                     | 0.00    |
| TOTAL NATIONAL FEE =   |              |              |           | \$                     | 0.00    |
| Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property                                     |              |              |           | \$                     | 0.00    |
| TOTAL FEES ENCLOSED =  |              |              |           | \$                     | 860.00  |
|  |              |              |           | Amount to be: refunded | \$      |
|  |              |              |           | charged                | \$      |

a. ☐ A check in the amount of \$ XXX.XX to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. XXX in the amount of \$ XXX to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 07-1337. A duplicate copy of this sheet is enclosed.

c. ☒ Fees are to be charged to a credit card **WARNING:** information on this form may be public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

**NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.**

SEND ALL CORRESPONDENCE TO:

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 REGISTRATION NUMBER

1972-1973

14-00000 69744692

- 1 -

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BOARD-MOUNTED ELECTRONIC DEVICE, IN PARTICULAR AN  
ELECTRONIC GAS LIGHTER, INCLUDING MEANS FOR FAST  
CONNECTION OF INSULATED ELECTRIC WIRES TO AN ELECTRIC  
10 CIRCUIT ON THE BOARD

## TECHNICAL FIELD

The present invention relates to a board-mounted electronic device including means for fast electric  
15 connection of insulated electric wires to an electric circuit on the board. Such a device is particularly useful for producing electronic gas-lighting devices for gas cookers.

## BACKGROUND ART

20 In currently used electric/electronic devices,  
various methods are employed for electrically connecting  
one or more conducting wires to a circuit printed (or  
as shown in EP-A-0177855, US-A-5484456 and EP-A-0177851  
carried) on a board; the most common consists in  
soldering the conducting wires to points or seats formed  
25 on the printed circuit; another consists in providing  
the circuit with terminals (normally applied and/or  
soldered to the board) which are either pressed directly

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- 2 -

onto the conducting wires, or are designed to receive corresponding male or female connectors fitted beforehand to the wires.

Such connecting systems are obviously slow, complicated, and therefore expensive and difficult to incorporate in automated assembly procedures.

#### DISCLOSURE OF INVENTION

It is an object of the present invention to provide an electronic device enabling electric connection of one or more insulated wires to an electric circuit on the device without incurring the aforementioned drawbacks, and which at the same time is compact and inexpensive.

According to the present invention, there is provided a board-mounted electronic device, in particular a gas-lighting device for gas cookers, as claimed in claim 1.

~~comprising : a board for supporting electronic components and supporting an electric circuit for mutual connection of said electronic components; and at least one terminal for electrically connecting said circuit and a respective insulated electric wire comprising an inner conductor with an insulating sheath coated and/or applied to the inner conductor; characterized in that said terminal comprises a metal blade forming part of said circuit and carried integrally by the board; said blade projecting from a first face of the board; and said blade being so formed as to define means for mechanically retaining and electrically connecting said~~

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- 3 -

~~electric wire, and which act on an end portion of said inner conductor.~~

The terminals may thus be formed integrally with the circuit and the supporting board, which form a single whole, e.g. by being formed by co-molding the board in synthetic plastic resin with respective tracks of the electric circuit defined by semicut metal strips; and the electric wires to be connected - which may be external wires for connecting the device to the power supply or to a user device, or wires for electrically connecting one or more electronic components on the device to the board-mounted electric circuit - are connected with no soldering or wire terminations required.

#### BRIEF DESCRIPTION OF DRAWINGS

Two preferred, non-limiting embodiments of the present invention will be described purely by way of example with reference to the accompanying drawings, in which:

Figure 1 shows an overall view in perspective of a first embodiment of the device according to the invention;

Figure 2 shows a top plan view of a portion of the Figure 1 device;

Figure 3 shows a rear cross section of a second embodiment of the device according to the invention;

Figures 4 and 5 show a rear and side view

respectively of a detail of the Figure 3 device.

BEST MODE FOR CARRYING OUT THE INVENTION

With reference to Figures 1 and 2, number 1 indicates as a whole an electronic device in accordance with the teachings of the present invention.

Device 1 - in the example, a known gas-lighting device not described in detail (and shown only partly in Figure 1 for the sake of simplicity) - comprises a supporting board 2; an electric circuit 3 carried by board 2 (only part of board 2 and electric circuit 3 is shown for the sake of simplicity); a pair of connecting terminals 4a and 4b connected to respective tracks of electric circuit 3; and a corresponding pair of insulated electric wires 5a and 5b.

Supporting board 2 is molded from synthetic plastic resin and has a face 6 for supporting electronic components.

Electric circuit 3 is known, and comprises a number of tracks (only tracks 7a, 7b, 7c shown partly, for the sake of simplicity) each defined by a semicut metal strip co-molded with supporting board 2.

Insulated electric wires 5a, 5b comprise respective inner conductors 8a, 8b of substantially circular cross section and covered with respective insulating sheaths 9a, 9b coated and/or applied to inner conductors 8a, 8b.

Each sheath 9a, 9b therefore has a cross section in the form of an annulus with an inside diameter equal to

the diameter of the respective inner conductor.

Terminals 4a, 4b are defined by respective conducting blades 10a, 10b forming part of electric circuit 3 and which project from face 6 of board 2 and are carried integrally by board 2.

Conducting blades 10a, 10b are in the form of integral extensions of respective tracks 7a, 7b of electric circuit 3, and are each bent into an L outwards of the plane of board 2.

Each blade 10a, 10b comprises, at a longitudinal end, a respective slot 11a, 11b in the form of a V-shaped groove for assisting insertion of insulated electric wire 5a, 5b inside a respective semicircular seat 12a, 12b, which houses electric wire 5a, 5b, is of a diameter substantially equal to the diameter of inner conductor 8a, 8b, and is formed at the vertex of the V-shaped groove defining slot 11a, 11b.

Slots 11a and 11b have respective cutting edges 13', 13" (slot 11a) and 14', 14" (slot 11b) for making respective incisions 15', 15" and 16', 16" on opposite sides of respective sheaths 9a and 9b when respective electric wires 5a and 5b are inserted inside respective seats 12a and 12b.

Since the diameter of seats 12a and 12b is smaller than the outside diameter of sheaths 9a and 9b and substantially equal to the diameter of inner conductors 8a and 8b, incisions 15', 15", 16', 16" are radially

through incisions.

Inner conductors 8a and 8b, at least at one point, therefore contact conducting blades 10a and 10b to form respective electric connections with electric circuit 3 via the conducting blades.

Moreover, each incision 15', 15", 16', 16" extends circumferentially along an arc of less than 180°, so that the continuity of sheaths 9a and 9b is maintained along respective portions 17a and 17b.

In actual use, by means of incisions 15', 15", 16', 16" and integral portions 17a and 17b, sheaths 9a and 9b cooperate mechanically with respective edges of seats 12a and 12b to retain the ends of electric wires 5a and 5b and so prevent the wires from sliding longitudinally.

Inner conductors 8a and 8b are therefore connected electrically to electric circuit 3 by contacting blades 10a and 10b as described above, and the ends of wires 5a and 5b are secured firmly to respective seats 12a and 12b.

Figures 3, 4 and 5 show a variation 1a of device 1 as described above, and in which, for the sake of simplicity, any similar or identical details are indicated using the same reference numbers.

The device in the second embodiment comprises supporting board 2; electric circuit 3; a pair of electric wires 5a, 5b; and a pair of conducting blades 18a, 18b for connecting electric wires 5a, 5b

electrically and mechanically to electric circuit 3.

Blades 18a and 18b are fitted integrally to supporting board 2 by means of respective stems 19', 19" (blade 18a) and 20', 20" (blade 28b), which also provide  
5 for establishing contact with respective tracks 7d and 7e of electric circuit 3.

Figures 4 and 5 show blade 18a; blade 18b is identical and therefore not shown in detail.

Blade 18a comprises a first tab 21a and a second  
10 tab 22a, which are positioned at least partly facing each other.

Tab 22a is bent at an acute angle towards tab 21a, so that an edge 23a of tab 22a contacts a surface 24a of tab 21a.

15 Tab 22a is elastically deformable to permit insertion of wire 5a between tabs 21a and 22a.

Similarly, blade 18b comprises a tab 21b, a tab 22b bent at an acute angle, an edge 23b, and a surface 24b.

With reference to Figure 3, insulating sheaths 9a  
20 and 9b are removed from respective ends 25a and 25b of electric wires 5a and 5b to enable inner conductor 8a to contact tabs 21a and 22a of blade 18a, and inner conductor 8b to contact tabs 21b and 22b of blade 18b.

At assembly, electric wires 5a and 5b are inserted  
25 inside respective ducts 26a and 26b.

By virtue of the rigidity of inner conductors 8a and 8b, electric wires 5a and 5b deform respective tabs

22a and 22b, so that end 25a is inserted between edge 23a and surface 24a, and end 25b is inserted between edge 23b and surface 24b.

Blades 18a and 18b therefore provide for  
5 electrically connecting as well as mechanically retaining electric wires 5a and 5b.

Clearly, changes may be made to device 1 as described herein without, however, departing from the scope of the present invention.

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## CLAIMS

1) A board-mounted electronic device, in particular a gas-lighting device for gas cookers, comprising:

- 5 a board (2) for supporting electronic components and supporting at least one conductive track (7a, 7b) for mutual connection of said electronic components, to form an electric circuit (3);

- and at least one terminal (4a, 4b) for electrically  
10 connecting said circuit (3) and a respective insulated electric wire (5a, 5b) comprising an inner conductor (8a, 8b) with an insulating sheath (9a, 9b) coated and/or applied to the inner conductor (8a, 8b);

- characterized in that said terminal (4a, 4b) comprises  
15 a metal blade (10a, 10b) formed in one piece with said track (7a, 7b) of said circuit (3), bent into an L outwards of the plane of the board (2) and carried integrally by the board (2); said blade (10a, 10b) being so formed as to define means (11a, 11b) for mechanically retaining and  
20 electrically connecting said electric wire (5a, 5b), and which act on an end portion of said inner conductor (8a, 8b).

- 2) A device as claimed in Claim 1, characterized in that said blade (10a, 10b) comprises a respective slot  
25 (11a, 11b) having cutting edges (13', 13", 13', 14") for cutting said insulating sheath (9a, 9b); the slot (11a, 11b) comprising a respective semicircular seat (12a, 12b) of a diameter substantially equal to that of said inner

18-07-00

conductor (8a, 8b) of the electric wire (5a, 5b) and in any case smaller than the diameter of the insulating sheath (9a, 9b); said slot (11a, 11b) receiving one end of said electric wire (5a, 5b) to cut said insulating sheath (9a, 9b) to such a depth as to establish contact between said blade (10a, 10b) and said inner conductor (8a, 8b) of the electric wire (5a, 5b), while at the same time forming a joint to mechanically retain the electric wire (5a, 5b) inside said seat (12a, 12b).

3) A device as claimed in Claim 2, characterized in that said slot (11a, 11b) is substantially in the form of a V-shaped groove for assisting insertion of said end of said electric wire (5a, 5b) inside said seat (12a, 12b), which is formed at the vertex of the V defining said groove.

4) A device as claimed in Claim 5, characterized in that said circuit comprises a number of tracks (7a, 7b), each defined by a semicut metal strip applied to said board (2).

5) A device as claimed in Claim 4, characterized in that said board (2) is molded from synthetic plastic resin, said strips being co-molded with the board (2).

1 / 3

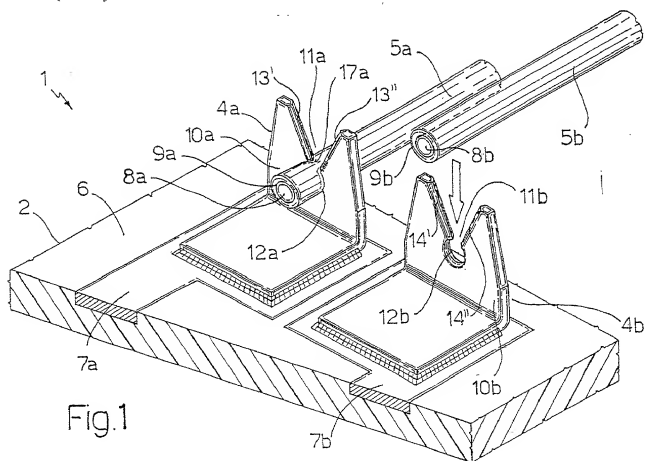


Fig.1

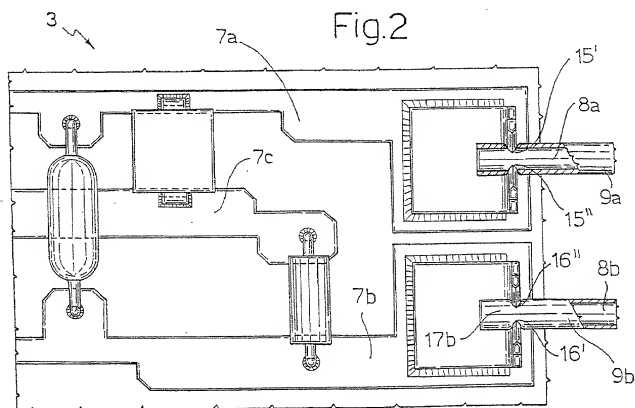


Fig.2

2 / 3

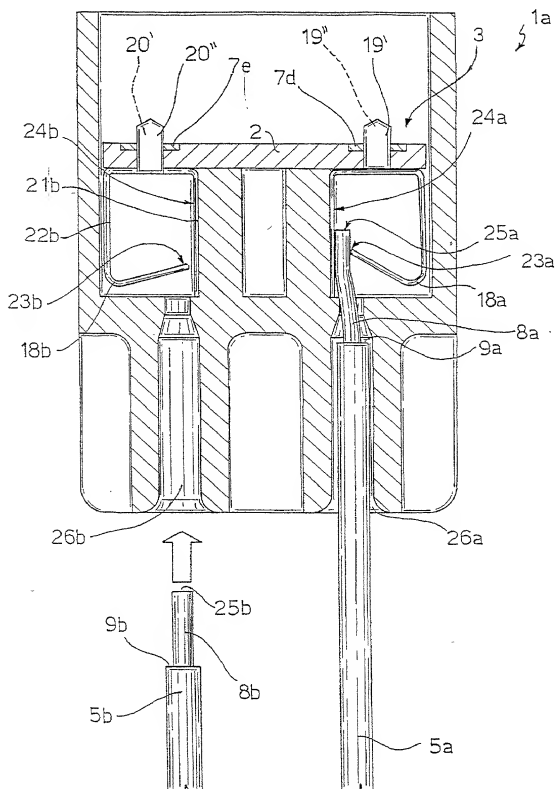
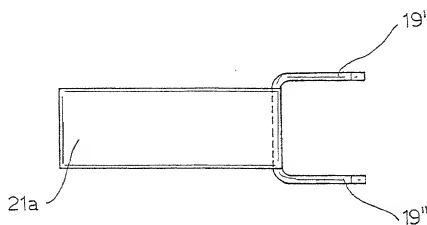
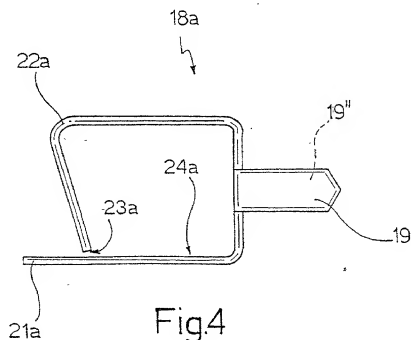


Fig.3

3 / 3



**DECLARATION FOR PATENT APPLICATION AND APPOINTMENT OF ATTORNEY**

As a below-named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name; I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention (Design, if applicable) entitled: **BOARD-MOUNTED ELECTRONIC DEVICE, IN PARTICULAR AN ELECTRONIC GAS LIGHTER, INCLUDING MEANS FOR FAST CONNECTION OF INSULATED ELECTRIC WIRES TO AN ELECTRIC CIRCUIT ON THE BOARD**

the specification of which (check one):

- ☐ Is attached hereto.  
☒ was filed on January 29, 2001 as Application Serial No. 09/744,692  
☒ was filed on 28 July 1999 as International Application (PCT) No. PCT/IT99/00248, and was amended on \_\_\_\_\_ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment(s) referred to above. I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, § 1.56. I hereby claim foreign priority benefits under Title 35, United States Code § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which the priority is claimed.

**PRIOR FOREIGN APPLICATION(S)**

| NUMBER         | COUNTRY | DAY/MONTH/YEAR FILED | PRIORITY CLAIMED  |
|----------------|---------|----------------------|---|
| TO98U000144    | IT      | 28 July 1998         | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| PCT/IT99/00248 | PCT     | 28 July 1999         | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) or PCT international application(s) designating The United States of America listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56 which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

| APPLICATION NUMBER | FILING DATE | STATUS (Patented, Pending or Abandoned) |
|--------------------|-------------|---|
|                    |             |   |
|                    |             |   |

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine, or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

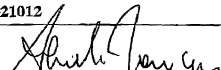
POWER OF ATTORNEY: I (We) hereby appoint as my (our) attorneys, with full powers of substitution and revocation, to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: Allan M. Lowe, Registration Number 19,641; Benjamin J. Hauptman, Registration Number 29,310; Michael G. Gilman, Registration Number 19,114; Kenneth M. Berger, Registration Number 37,093; and Randy A. Noranbrock, Registration Number 42,940.

Send correspondence to: **LOWE HAUPTMAN GILMAN & BERNER, LLP**  
 1700 Diagonal Road, Suite 310  
 Alexandria, Virginia 22314

TELEPHONE CALLS TO: **Benjamin J. Hauptman**  
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I hereby authorize the U.S. attorneys and agents named herein to accept and following instructions from **STUDIO TORTA S.r.l.** as to any actions to be taken in the U.S. Patent and Trademark Office regarding this application without direct communication between the U.S. attorneys and the undersigned. In the event of a change in the person(s) from whom instructions may be taken, the U.S. attorneys will be so notified by the undersigned.


☒ See following page(s) for additional joint inventors.

|  |                    |   |
|--|--------------------|---|
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| Date <b>March 29, 2001</b>                                 |                    | SIGNATURE  |

ATTORNEY DOCKET NO: 713-428

## DECLARATION FOR PATENT APPLICATION AND APPOINTMENT OF ATTORNEY

Page 2

|                                     |                             |             |   |
|-------------------------------------|-----------------------------|-------------|---|
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| City                                | <u>Villa Guardia I T X</u>  |             |   |
| State or Country                    | <u>Italy</u>                | Zip         | <u>I-22079</u>  |
| DATE                                | <u>March 29, 2001</u>       |             | SIGNATURE  |

|                                     |             |
|-------------------------------------|-------------|
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| State or Country                    | Zip         |
| DATE                                | SIGNATURE   |

|                                     |             |
|-------------------------------------|-------------|
| Full Name of First or Sole Inventor | Citizenship |
| Residence Address - Street          |             |
| City                                |             |
| State or Country                    | Zip         |
| DATE                                | SIGNATURE   |

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| Full Name of First or Sole Inventor | Citizenship |
| Residence Address - Street          |             |
| City                                |             |
| State or Country                    | Zip         |
| DATE                                | SIGNATURE   |

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|-------------------------------------|-------------|
| Full Name of First or Sole Inventor | Citizenship |
| Residence Address - Street          |             |
| City                                |             |
| State or Country                    | Zip         |
| DATE                                | SIGNATURE   |

☐ See following pages for additional joint inventors.